Algebra 2
Chapter 7 Review

Name: KEY
Date: _____ Pd: _____

Express using rational exponents.

1) $\sqrt{29} =$ $29^{\frac{1}{2}}$

2) $\sqrt[5]{ab^3} =$ $a^{\frac{1}{5}}b^{\frac{3}{5}}$

3) $\sqrt[4]{5a^3bc^2} =$ $5^{\frac{1}{4}}a^{\frac{3}{4}}b^{\frac{1}{4}}c^{\frac{1}{2}}$

Express in simplest radical form.

4) $5^{\frac{1}{3}} =$ $\sqrt[3]{5}$

5) $13^{\frac{3}{4}} =$ $\sqrt[4]{2197}$

6) $4^{\frac{1}{3}}a^{\frac{1}{4}} =$ $\sqrt[12]{256a^3}$

Evaluate each expression.

7) $125^{\frac{2}{3}} =$ 25

8) $36^{\frac{1}{2}} =$ 6

9) $32^{\frac{3}{5}} =$ 8

10) $\log_4 64 =$ 3

11) $\log_3 \frac{1}{81} =$ -4

12) $\log_3 1 =$ 0

13) $\log_{\frac{1}{4}} 256 =$ -4

14) $\log_9 3 =$ $\frac{1}{2}$

15) $\log_{64} 8 =$ $\frac{1}{2}$

Find the multiplier for each rate of exponential growth or decay.

16) 9.7% growth 1.097

17) 24% decay .76

18) 3.8% decay .962

19) 0.04% growth 1.0004

Answer the word problem. Don't forget units!

20) A physician gives a patient 750 milligrams of an antibiotic that is eliminated from the bloodstream at a rate of 12% per hour. Predict the number of milligrams remaining after 7 hours.

$750(0.88)^7 = 306.51 \text{ mg}$

21) The population of a city was approximately 675,000 in the year 2000 and was projected to grow at an annual rate of 4.5%. Predict the population for the year 2015.

$675{,}000(1.045)^{15} = 1{,}306{,}316 \text{ people}$

22) The population of a city in the year 2000 was 262,758,000. The population in 2000 was expected to decrease at a rate of 3.2% per decade. What is the expected population in the year 2030?

$262{,}758{,}000(.968)^3 = 238{,}331{,}815 \text{ people}$

Write each of the following in logarithmic form:

23) $3^2 = 9$

$\log_3 9 = 2$

24) $8^{\frac{1}{3}} = 2$

$\log_8 2 = \frac{1}{3}$

25) $6^{-2} = \frac{1}{36}$

$\log_6 \frac{1}{36} = -2$

Write each in exponential form:

26) $\log_7\left(\frac{1}{49}\right) = -2$

$7^{-2} = \frac{1}{49}$

27) $\log_x 8 = y$

$x^y = 8$

28) $\log_y x = -5$

$y^{-5} = x$

Write each expression as a single logarithm:

29) $\log_2 13 + \log_2 4$

$\log_2 52$

30) $\log_3 22 - \log_3 4$

$\log_3 \frac{11}{2}$

31) $\log_5 15 + \log_5 8 - 2\log_5 2$

$\log_5 120 - \log_5 4$

$\log_5 30$

32) $3\log_7 x - 8\log_7 y$

$\log x^3 - \log_7 y^8$

$\log \frac{x^3}{y^8}$

Solve each equation for x: No decimal answers. Be sure to check for extraneous solutions

33) $4^{x+2} = 16^x$

$4^{x+2} = 4^{2(x)}$

$x+2 = 2x$

$x = 2$

$x =$ 2

34) $9^{2-x} = 27^{2x}$

$3^{2(2-x)} = 3^{3(2x)}$

$4 - 2x = 6x$

$\frac{4}{8} = \frac{8x}{8}$

$x =$ $\frac{1}{2}$

35) $5^{3x+4} = 125^{x-1}$

$5^{3x+4} = 5^{3(x-1)}$

$3x+4 = 3x-1$

$4 = -1$

$x =$ NO SOLUTION

36) $\log_3(16+2x) = \log_3(x^2-4x)$

$16+2x = x^2-4x$

$x^2-6x-16=0$

$(x-8)(x+2)=0$

$x=8 \quad x=-2$

$x =$ $8, -2$

37) $\log_{16} 4 + \log_{16} x^2 = 1$

$\log_{16} 4x^2 = 1$

$4x^2 = 16$

$4x^2-16=0$

$4(x^2-4)=0$

$(x-2)(x+2)=0$

$x=2$

$x=-2$

$x =$ $2, -2$

38) $\log_5(x-3)=2$

$5^2=x-3$

$25=x-3$

$x=28$

x = 28

39) $\log_2(x+6)-\log_2(x)=2$

$\log_2 \frac{x+6}{x}=2$

$2^2=\frac{x+6}{x}$

$4=\frac{x+6}{x}$

$4x=x+6$

$3x=6$

$x=2$

x = 2

40) $\log(x+21)+\log x=2$

$\log_{10} x^2+21x=2$

$x^2+21x=100$

$x^2+21x-100=0$

$(x+25)(x-4)=0$

$x=-25, 4$

x = 4

41) $\log_2(x+3)+\log_2(x-2)=\log(x^2-3)$

$\log_2 x^2+x-6=\log x^2-3$

$x^2+x-6=x^2-3$

$x-6=-3$

$x=3$

x = 3

Use the change of base formula to evaluate each logarithmic expression to the nearest hundredth.

42) $\log_8 50$ $\frac{\log 50}{\log 8}$

1.88

43) $\log_{\frac{1}{2}} 15$ $\frac{\log 15}{\log \frac{1}{2}}$

-3.91

44) $\log_{\frac{3}{2}} 56$ $\frac{\log 56}{\log \frac{3}{2}}$

9.93

Solve each equation for x. Round answers to the nearest hundredth:

45) $4^{3x}=56$

$\log 4^{3x}=\log 56$

$\frac{3x\log 4}{\log 4}=\frac{\log 56}{\log 4}$

$\frac{3x}{3}=\frac{2.90}{3}$

x = .97

46) $10^{2x-9}=350$

$\log 10^{2x-9}=\log 350$

$\frac{2x-9\log 10}{\log 10}=\frac{\log 350}{\log 10}$

$2x-9=2.54$

$\frac{2x}{2}=\frac{11.54}{2}$

x = 5.77